SPECIFICATIONS

Items \ Models		ME453A/B/C	ME538A/B/C	
		70 MHz Band	70 MHz Band	140 MHz Band
Amplitude (IF INPUT terminal)	Inherent Slope	±0.05 dB/±25 MHz	±0.05 dB/±25 MHz	±0.05 dB/±25 MHz, ±0.1 dB/ ±40 MHz, ±0.2 dB/±50 MHz
	Measuring Range	0 to 16 dB		
	Max Sensitivity	0.01 dB/DIV (at Y2 Display)		
	IF INPUT Level	+10 to −20 dBm		
Amplitude (RET. LOSS INPUT terminal)	Inherent Slope	±1 dB		
	Measuring Range	0 to 8 dB		
	Sensitivity	1 dB/DIV		
	INPUT Level	−60 to −20 dBm		
Group Delay	Inherent Slope	0.3 ns/±15 MHz, 0.5 ns/ ±25 MHz	0.3 ns/±15 MHz, 0.5 ns/ ±25 MHz	0.3 ns/±20 MHz, 0.5 ns/±30 MHz, 1 ns/±50 MHz
	Measuring Range	0 to 400 ns		
	Max Sensitivity	0.1 ns/DIV (at Y2 Display)		
	Noise	0.01 ns/Condition; f_M = 200 kΩ ~ 278 kHz, Deviation 200 kHz rms, Using Average function.		
Linearity	Inherent Slope	0.2%/±25 MHz	0.2 %/±25 MHz	0.2 %/±50 MHz
	Measuring Range	0 to 80 %		
	Max Sensitivity	0.05 %/DIV		
	Noise	0.005 %/Condition, f_M <1 MHz, Deviation 200 kHz rms, Using Average function.		
Differential Phase	Inherent Slope*1	0.3°/±15 MHz, 0.5°/±25 MHz	0.3°/±15 MHz, 0.5°/±25 MHz	0.3°/±20 MHz, 0.5°/±30 MHz, 0.8°/ ±50 MHz
	Measuring Range	0 to 40°		
	Max Sensitivity	0.2°/DIV		
	Noise	0.02°/Condition, f_M = 5.6 MHz, Deviation 500 kHz rms, Using Average function.		
		*1: Specified frequency range = Carrier sweep width + 2 f_M		
Differential Gain	Inherent Slope*2	0.2 %/±15 MHz, 0.4 %/ ±25 MHz	0.2 %/±15 MHz, 0.4 %/ ±25 MHz	0.3 %/±20 MHz, 0.4 %/±30 MHz, 0.6 %/±50 MHz
	Measuring Range	0 to 80 %		
	Max Sensitivity	0.05 %/DIV		
	Noise	0.01 %/Condition, f_M = 5.6 MHz, Deviation 500 kHz rms, Using Average function		
		*2: Specified frequency range = Carrier sweep width + 2 f_M		
IF Return Loss	Frequency Range	70 ±25 MHz	70 ±25 MHz	140 ±50 MHz
	Measuring Range	10 to 50 dB accuracy depends on using bridge.		
	Sensitivity	1 dB/DIV		
AM to PM Conversion	Residual PM	0.3°/dB/±25 MHz	0.3°/dB/±25 MHz	0.3°/dB/±35 MHz
	Measuring Range	0.3°/dB to 16°/dB		
Spectrum	Center Frequency	70 ±20 MHz Auto tuning	70 ±20 MHz Auto tuning	140 ±30 MHz Auto tuning
	Sweep Width	Approx. ±700 kHz		
	Max Sensitivity	Detects 0.1 dB change of modulating signal at carrier zero point.		

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Deviation	Measuring Range	20 kHz to 999 kHz rms at built-in BB frequencies ≦ 8.2 MHz.
	Accuracy	10 % at built-in BB frequency ≦ 8.2 MHz.
	Calibration	Deviation meter is calibrated by easy key operation. Accuracy reaches 1 % theoretically at specified modulation frequency. Deviation is as shown in the following table by Bessel zero method.

Model	Modulation freq.	Key in factor
A type	200 kHz	340 kHz rms
B type	277.778 kHz	472 kHz rms
C type	250 kHz	425 kHz rms

Modulator Sensitivity	Mod Signal Level	−50 to +10 dBm
	Deviation	Use the DEVIATION meter function or use the carrier zero deviation with the SPECTRUM function.
De-modulator Sensitivity	IF Signal	Calibrate the deviation with DEVIATION meter function or SPECTRUM function.
	Demo BB Level	−50 to +10 dBm
DC Input		Measuring Range: 0 to ±400 mV, Max Sensitivity: 1 mV/DIV

BB to BB	Items	Inherent Slope	Measuring Range	Max Sensitivity	Noise
	Group Delay	Negligible	0 to 400 ns	0.1 ns/DIV (at Y2)	Negligible
	Linearity	Negligible	0 to 80 %	0.05 %/DIV	Negligible
	Differential Phase	Negligible	0 to 40°	0.2°/DIV	Negligible
	Differential Gain	Negligible	0 to 80 %	0.05 %/DIV	Negligible
	Measuring Condition	BB level; −30 dBm, Using the AVERAGE function.			

BB Return Loss	Frequency	Built-in BB frequencies.
		100 kHz to 13 MHz (sweeping method. BB AMPLITUDE option must be designated).
	Measuring Range	10 to 47 dB (Replacement from BB level), 10 to 40 dB (BB AMPLITUDE option), accuracy depends an bridge to be used.
	Sensitivity	1 dB/DIV (BB AMPLITUDE option).

Input/ Output	Items		Level Range	Level Accuracy	Impedance	
	IF Input		+10 to −20 dBm	±0.3 dB (+4 dBm)	75 Ω, > 30 dB (+4 dBm)	Demodulation freq.: 66.6 kHz, 80 k to 8.2 MHz
	IF Output		+10 to −70 dBm	±0.3 dB (+4 dBm)	75 Ω, > 30 dB (+4 dBm)	Modulation frequency: 66.6 kHz to 12.39 MHz
	BB Input		+10 to −50 dBm	±0.3 dB (0 dBm)	75 Ω, > 28 dB (0 dBm)	Frequency: 66 kHz to 15 MHz
	BB + SWEEP Output	BB	+10 to −50 dBm	±0.3 dB (0 dBm)	75 Ω, > 28 dB (−10 dBm)	Frequency: 66 kHz to 13 MHz
		SWEEP	0 to 6.5 Vp-p/75 Ω	±10 % (6 Vp-p)	75 Ω	Frequency: 18 to 100 Hz
	SWEEP Output		0 to 25 Vp-p/10 kΩ	±10 % (24 Vp-p)	——	Frequency: 18 to 100 Hz
	AUX IF Output		−10 dBm	±1 dB	75 Ω	
	X'tal Output		+5 dBm	±1 dB	75 Ω	

BB Amplitude (Option)	Frequency Range: 100 kHz to 13 MHz, level: +10 to −50 dBm, Inherent Slope: ±0.5 dB/100 kHz to 13 MHz. Measuring Range: 0 to 8 dB, Max. Sensitivity: 0.1 dB/DIV.
Power	** V ±10 %, 50/60 Hz, ≦ 220 VA
Dimension and Weight	Receiver: 177 H, 426 W, 450 Dmm ≦ 18.5 kg Transmitter: 133 H, 426 W, 450 Dmm ≦ 13.5 kg

SPECIFICATIONS

RECEIVER

<table>
<tr><td rowspan="3">Frequency Marker</td><td>SLIDE</td><td colspan="5">Variable Slide Markers: 70 ±25 MHz, 140 ±50 MHz</td></tr>
<tr><td>2 MHz COMB + SLIDE</td><td colspan="5">2 MHz Comb markers + Variable side markers.</td></tr>
<tr><td>Accuracy</td><td colspan="5">Counter display with resolution 10 kHz.</td></tr>
<tr><td rowspan="2">X-Y Recorder Output</td><td>Output</td><td colspan="5">X: 0 to 4 V Y: 0 to 4 V Pen lift: open, Pen down: Ground</td></tr>
<tr><td>Sweep Speed</td><td colspan="5">20 sec, 40 sec</td></tr>
<tr><td colspan="2">Phase Detector Capture Range</td><td colspan="5">±5 Hz ≦ 555.556 kHz, 5 x 10^{-6} ≦ 12.39 MHz</td></tr>
<tr><td colspan="2">EXT SWEEP Input (rear panel)</td><td colspan="5">Frequency: 18 Hz to 100 Hz, Level: 0.5 Vp-p to 2 Vp-p</td></tr>
<tr><td colspan="2">BB OUTPUT (rear panel)</td><td colspan="5">−7 dBm/75 Ω</td></tr>
<tr><td colspan="2" rowspan="3">Inherent Noise (IF to IF)</td><td>Group Delay</td><td>Linearity</td><td>Differential Phase</td><td>Differential Gain</td><td rowspan="3">Detector Band: 3 kHz</td></tr>
<tr><td>66 to 93 kHz: 0.3 ns rms
200 to 278 kHz: 0.1 ns rms
400 to 556 kHz: 0.05 ns rms</td><td>0.02 % rms</td><td>0.05° rms</td><td>0.1 % rms</td></tr>
<tr><td colspan="2">Deviation: 200 kHz rms, f_M < 1 MHz</td><td colspan="2">Deviation: 500 kHz rms, f_M = 5.6 MHz</td></tr>
</table>

TRANSMITTER

SWEEP OUTPUT Frequency	Line (50/60 Hz), 70 Hz, option (one frequency between 18 Hz and 100 Hz can be designated), EXT. (18 Hz to 100 Hz).
EXT SWEEP Input (rear panel)	Frequency: 18 Hz to 100 Hz, Level: 2 Vp-p, Impedance: 10 kΩ
EXT BB Input (rear panel)	Frequency: 80 kHz to 15 MHz, Level: −7 dBm, Impedance: 75 Ω
IF CENTER FREQUENCY* Accuracy	Frequency: 45 to 95 MHz, 90 to 190 MHz, 10 kHz resolution panel display.
SWEEP WIDTH	70 MHz band: 0 to ±25 MHz, 140 MHz band: 0 to ±50 MHz, 0.1 MHz resolution panel display. Auto Sweep Reduction: Modulation frequency > 1 MHz.
FM Deviation	0.5 to 1000 kHz rms, 1 kHz resolution panel display.
BB FREQUENCY	Low freq.; A type − 66.666, 200 and 400 kHz, B type − 92.593, 277.778, 555.556 kHz, C type − 83.333, 250, 500 kHz, High freq.; 2 (type A), 2.4 (B, C type), 3.58, 4.43, 5.6, 8.2 MHz 12.39 MHz (ME538A/B/C), EXT: 66 kHz to 12.39 MHz. Accuracy: Low freq. − ±5 Hz, High freq. − ±5 x 10^{-4}.